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TRACK SUPPORTED WINCH AND METHOD OF MAKING THE SAME

1 Background of the Invention.

2 Field of the Invention

3 The invention pertains to winches of the type slidably supported
4 upon tracks, and the method for forming the same.

5 Description of the Related Art

6 Winches used to tighten cargo retaining straps are often mounted
7 upon elongated tracks fixed to a vehicle bed, floor, or vehicle
8 wall. For ease of proper positioning of the winch, the winches are
9 often slidably associated with their track wherein the winch may
10 be moved along the length of the track to its most desirable
11 position. As the tension forces within the load strap are
12 substantially perpendicular to the length of the track, tensioning
13 of the strap will frictionally lock the winch to the track, and
14 with many winches of this type, separate track locking structure
15 is not required.

16 A low cost load retaining winch used with LL track having hooks
17 and flanges usually consists of a base member having spaced
18 parallel legs or sides extending therefrom. With winches of the
19 aforescribed type, it has been the practice to form the winch
20 base by a pair of rectangular plates welded to the legs or sides.
21 The plates are of such configuration as to define lips for engaging
22 the track hook flanges, and openings are defined in the winch sides
23 to provide clearance for the track flanges.

1 This prior art construction requires that the winch base and
2 side walls are formed of four separate components, and the side
3 walls are welded to the base plates, and such secondary operations
4 as welding are expensive, require time consuming jigging of the
5 components prior to welding, and are susceptible to strength
6 variations in the event proper welding has not occurred.

7 Objects of the Invention.

8 It is an object of the invention to provide a method for forming
9 a winch wherein track engaging lips for mounting the winch upon a
10 track are homogeneously formed upon the winch base eliminating the
11 need for secondary operations.

12 Another object of the invention is to provide a winch for use
13 with load retaining straps wherein the winch includes a base having
14 leg portions extending therefrom and the track mounting structure
15 is homogeneously defined on the winch base.

16 An additional object of the invention is to provide a winch for
17 load restraining straps slidably mountable upon an elongated track
18 wherein the winch includes a base having homogeneously defined leg
19 portions extending therefrom in which a windlass is rotatably
20 mounted, track supporting structure being homogeneously defined in
21 the winch base and openings providing track clearance are defined
22 in the winch walls, all of the base and wall components being
23 formed on a plate blank, the winch base and leg portions being
24 formed upon bending the punched plate blank.

1 Summary of the Invention.

2 Winches mounted upon vehicles for load retaining purposes
3 wherein the winches are employed to tension load engaging straps
4 are usually relatively small, and are of economical construction.
5 Such winches are usually connectable to, or mounted upon, elongated
6 tracks bolted or welded to the vehicle structure whereby the winch
7 may be positioned along the length of the track merely by sliding
8 the winch thereon. Tensioning of the winch strap imposes a force
9 on the winch perpendicular to the track length producing a high
10 frictional engagement between the winch and track.

11 A popular vehicle mounted track for use with load bearing
12 winches is of the LL cross-sectional configuration wherein the
13 track includes spaced parallel hooks extending in a common
14 direction from the track base, and each of the hooks includes an
15 elongated flange in spaced relationship to the track base. Lips
16 defined upon the winch base are received upon the flanges between
17 the flanges and the track base and openings are defined in the
18 winch base and walls to provide access for the track flanges. In
19 this manner, the winch, when its load engaging straps are not
20 tensioned, may be readily moved along the longitudinal length of
21 the track, but upon tightening of the load straps, the strap
22 tension forces frictionally lock the winch to the track.

23 Previously, the track flange engaging lips defined on the winch
24 base were formed by separate plates welded to the winch wall
25 portions wherein such plates constitute the winch base itself.

1 Such a construction requires extensive fabrication as the base
2 plates must be welded to the leg portions in an accurate manner.

3 In the practice of the invention, a steel plate or blank is
4 placed in a punch press and notches, a slot having enlarged ends
5 at the slot ends, and windlass receiving holes are defined in the
6 blank. Upon bending the leg portions of the blank at a 90°
7 orientation to the central base portion of the blank, a lateral
8 edge of the blank, and an edge of the slot, define lips capable of
9 being received on the track hook flanges, and enlarged openings
10 formed adjacent the slot ends also extend into the leg portions
11 providing openings for clearance of the track.

12 Because the winch mounting structure is homogeneously defined
13 from the winch plate blank, the only secondary operation required
14 is the bending of the blank leg portions, and no welding procedures
15 are required, as was necessary with the previously described
16 version of the invention.

17 The elimination of welds assures uniform strength and the
18 practice of the invention substantially reduces the cost of
19 manufacturing this type of load retaining winch.

20 Brief Description of the Drawings.

21 The aforementioned objects and advantages of the invention will
22 be appreciated from the following description and accompanying
23 drawings wherein:

24 FIG. 1 is a perspective view of a prior art winch having base
25 plates welded to side or leg portions,

1 FIG. 2 is a side elevational end view of the prior art winch
2 of FIG. 1 as taken from the left thereof,
3 FIG. 3 is a perspective view of a winch in accord with the
4 invention,
5 FIG. 4 is an end elevational view of the winch of FIG. 3,
6 FIG. 5 is a plan view of the steel blank, after punching,
7 flame cutting, etc., from which the winch frame in
8 accord with the invention is formed, and
9 FIG. 6 is a plan view of the base of a winch frame
10 constructed in accord with the invention concepts.

11 Description of the Preferred Embodiment.

12 A prior art winch over which the invention is an improvement
13 mountable upon LL track is shown in FIGS. 1 and 2, the winch being
14 generally indicated by reference 10. The winch 10 includes a
15 rectangular base plate 12 and a similar rectangular base plate 14.
16 The plates 12 and 14 are welded to legs or side walls 16 formed of
17 plate material, the plane of the base plates being perpendicular
18 to the plane of the spaced parallel legs 16.

19 As best appreciated from FIG. 2, the base plate 12 is of such
20 width as to define a lip 18 extending beyond the edge of the legs
21 16, and a similar lip 20 is defined by base plate 14. A space or
22 clearance 22 exists between the plates 12 and 14 in alignment with
23 openings 24 defined in the legs 16 as will be appreciated from the
24 drawing.

25 A windlass shaft 26 is rotatably mounted within holes defined
26 in the legs 16, and the end of the windlass shaft not visible in

1 the drawing includes a hexagonal head, or other torque transfer
2 structure permitting the windlass to be rotated, as is well known
3 in the art. The other end of the windlass 26 includes the ratchet
4 28 engaged by the dog 30 pivoted on the associated leg 16 assuring
5 unidirectional rotation of the windlass during strap tensioning.
6 The dog 30 may be removed from the teeth of the ratchet 28 when it
7 is desired to rotate the windlass in a non-strap tensioning
8 direction. The windlass is formed with a diametrical slot 32 in
9 which the load retaining strap, not shown, extends which is wound
10 upon the windlass as it rotates.

11 The winch 10 is mounted upon a LL track 34, shown in dotted
12 lines in FIG. 2, and the track 34 includes a base 35 which is
13 attached to the vehicle bed or wall by screws, bolts, rivets or
14 welding, not shown, and hooks 36 extend from the track base
15 terminating in flanges 38 which are in a spaced parallel
16 relationship to the plane of the track base 35.

17 The winch 10 may be mounted upon the track 34 by aligning the
18 lips 18 and 20 with the track flanges when the winch is located at
19 the end of the track 34 wherein movement of the winch 10 in a
20 longitudinal direction parallel and in alignment with the track
21 permits the lips 18 and 20 to rest upon the track flanges 38 as
22 shown in FIG. 2. This mounting of the winch on the track is
23 possible because the openings 24 formed in the legs 16 accommodate
24 the right hook and flange as represented in FIG. 2.

25 The winch 10 is longitudinally moved along the track 34 as
26 desired, and the load strap is then passed around the load, not

1 shown, and through the windlass slot 32. Rotation of the windlass
2 winds the strap thereon tensioning the strap to restrain the load.
3 Rotation of the windlass in the opposite strap release direction
4 is prevented by the ratchet 28 and dog 30. As the load strap is
5 tensioned, the force within the load strap is perpendicular to the
6 length of the track 34 and produces a frictional engagement between
7 the winch and track which prevents relative movement therebetween
8 and the winch effectively tensions the load retaining strap as
9 desired. To release the strap tension, the windlass 26 is slightly
10 rotated in a strap tensioning direction, the dog 30 is pivoted away
11 from the teeth of the ratchet 28, and the windlass may then be
12 rotated in a strap tension releasing direction as is well known.

13 Winches constructed in accord in the aforedescribed manner
14 properly function, but are expensive to manufacture in that the
15 plates 12 and 14 must be welded to the legs 16, and it is the
16 purpose of the invention to eliminate this secondary welding
17 operation.

18 With reference to FIGS. 3 - 5, the winch 40 utilizing the
19 concepts of the invention has the same general overall appearance
20 as the winch 10. The winch 40 includes a U-shaped frame 42 which
21 is formed from a flat plate blank 44 of metal, as described below.

22 The blank 44 includes a central region 46 and end or leg regions
23 48, and the blank 44 includes an elongated lateral side or edge 50
24 parallel to the opposite lateral side or edge 52.

25 The plate blank 44 may be formed by a punching operation in a
26 punch press, flame cutting, or other known techniques, and the

1 operation includes the formation of the spaced notches 54
2 intersecting the lateral edge 50 so as to define a lip 56
3 therebetween.

4 Also, a longitudinally extending slot 58 is punched in the blank
5 44 centrally intermediate the sides 50 and 52 and openings 60 are
6 defined at the ends of the slot 58 which include the recesses 62
7 which define a lip 64. From FIG. 5, it will be appreciated that
8 each notch 54 is aligned with an opening 60 in a direction
9 perpendicular to the length of the blank 44.

10 Windlass receiving holes 66 are defined in the blank leg regions
11 48 as is the hole 68 for receiving the dog pivot.

12 Upon forming the blank 44 as described above having the
13 configuration shown in FIG. 5, the blank leg portions 48 are then
14 bent along bend lines 70 passing through the aligned notches 54 and
15 slot openings and recesses 60 and 62. The leg regions 48 are bent
16 so as to be 90° with respect to the central region 46 which now
17 constitutes the base region of the formed winch 40 as shown in
18 FIGS. 3 and 4.

19 Upon completion of the bending of the leg regions or portions
20 48, the windlass 72 may be rotatably located within the aligned
21 holes 66 and the ratchet 74 affixed to the windlass while the dog
22 76 will engage the teeth of the ratchet as pivoted upon a pivot
23 received within hole 68.

24 The configuration of the formed winch 40 in accord with the
25 inventive concepts will be readily appreciated from FIGS. 3, 4 and
26 6. The notches 54 define clearance for the left track hook 36 as

1 shown in FIG. 4, while the slot openings 60 which also extend into
2 the leg regions 48 provide clearance for the right track hook 36
3 and right flange 38 as in shown in FIG. 4. As will be appreciated
4 from FIG. 4, the winch lips 56 and 64 will engage the flanges of
5 the track 34 for mounting the winch 40 thereon in exactly the same
6 manner as the mounting of the winch 10 upon the track 34.

7 By bending the blank 44 along the bend lines 70 which intersect
8 the notches 54 and openings 60, clearances are provided in the
9 winch frame legs 48 for the track hooks and flanges, and a winch
10 constructed in accord with the invention eliminates all secondary
11 welding operations as described above with respect to the prior art
12 shown in FIGS. 1 and 2. As the lips 56 and 64 are homogeneously
13 formed of the material of the blank 44, maximum strength
14 characteristics are achieved without the need for secondary
15 operations, and the winch 40 may be manufactured at a cost
16 significantly less than the prior art winch 10 shown in FIGS. 1 and
17 2.

18 It is appreciated that various modifications to the inventive
19 concepts may be apparent to those skilled in the art without
20 departing from the spirit and scope of the invention.